

RECEIVED

OCT 24 1986

MINERALS PROJECTS

(October 21, 1986)

MEMORANDUM

TO: Bob Dent
FROM: Brian Buck *B. Buck*
RE: Surface Water Monitoring Results, Pine Creek, Carr Fork Property

Attached are the results of the first water quality sampling on Pine Creek. This sampling follows the conditions of the DOGM approval of the Carr Fork Reclamation/Stabilization Plan. The sampling occurred on September 18, 1986, during the reclamation of the Pine Canyon landfill.

The results indicate a general increase in TSS at all three stations which would be expected during the rerouting of Pine Creek in the diversion. The high TSS does not represent waste materials from the landfill being discharged as there was no surface discharge of water from the construction area into Pine Creek during the reclamation. The results also show increases in dissolved metals at all three stations which we likewise attribute to the disturbance of the channel gravels in the diversion. These gravels contain a significant proportion of slag particles which would be expected to release small amounts of metals when disturbed. This conclusion is based on the fact that station SW-12 is in the diversion, upstream from the landfill, and it has elevated levels of metals that in some instances are greater than the levels at the downstream stations. With the exception of the lead value for SW-12 (0.16 ppm), all dissolved metals values for all stations are within current primary drinking water standards. The elevated dissolved lead value is within the drinking water standard at station SW-9 where the creek exits the Anaconda property. We feel that the metals values at all of these stations should decrease with time once the diverted channel stabilizes.

We suggest that the future monitoring of these stations and SW-7 not include CN, S, TOC, O&G and Mo which were included in the baseline investigations but have subsequently been found to be lacking in all samples.

67 SOUTH COMMERCE LOOP
OREM, UTAH 84057
(801) 226-8822

2875 MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1163

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121

LAB NO.: U015044

DATE SAMPLED: 9-18-86

TIME SAMPLED: 0930

SAMPLED BY: E.L.

LOCATION: SW-8
Anaconda - Carr Fork

COMMENTS: Metals - Dissolved

PARAMETER	LEVEL
Chloride as Cl, mg/l	27.2
Chromium as Cr (Hex.), mg/l	--
Chromium as Cr (Total), mg/l (diss)	<.01
Conductivity, umhos/cm	509
Copper as Cu, mg/l	0.015
Fluoride as F, mg/l	0.18
Hardness as CaCO ₃ , mg/l	234
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.46
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.020
Magnesium as Mg, mg/l	29.2
Manganese as Mn, mg/l	0.012
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	<.01
Nitrate as NO ₃ -N, mg/l	1.67
Nitrite as NO ₂ -N, mg/l	0.025
Phosphate as PO ₄ -P, mg/l (ortho)	0.050
Potassium as K, mg/l	3.4
Selenium as Se, mg/l	<.002
Silica as SiO ₂ (Dissolved), mg/l	--
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	8.22
Sulfate as SO ₄ , mg/l	61
Total Dissolved Solids, mg/l	343
Turbidity, NTU	--
Zinc as Zn, mg/l	0.035
pH Units	8.45
TOC, mg/l	18.8
Oil & Grease, mg/l	<.5

PARAMETER	LEVEL
Acidity as CaCO ₃ , mg/l	0
Alkalinity as CaCO ₃ , mg/l	162
Ammonia as NH ₃ -N, mg/l	<.1
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	<.01
Bicarbonate as HCO ₃ , mg/l	186
Boron as B, mg/l	0.18
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	49.2
Carbonate as CO ₃ , mg/l	9.7
Molybdenum as Mo, mg/l	<.01
TSS, mg/l	1170
Cyanide as CN, mg/l	<.002
Sulfide as S, mg/l	<.1

Res. Hendrickson
CHEMTECH

367 SOUTH COMMERCE LOOP
 OREM, UTAH 84057
 (801) 226-8822

2875 MAIN
 SUITE #101
 SALT LAKE CITY, UTAH 84115
 (801) 483-1163

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants,, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121
 LAB NO.: U015044
 DATE SAMPLED: 9-18-86
 TIME SAMPLED: 0930
 SAMPLED BY: E.L.
 LOCATION: SW-8
Anaconda - Carr Fork
 COMMENTS: Metals - TOTAL

PARAMETER

LEVEL

Chloride as Cl, mg/l	
Chromium as Cr (Hex.), mg/l	
Chromium as Cr (Total), mg/l	0.032
Conductivity, umhos/cm	
Copper as Cu, mg/l	2.95
Fluoride as F, mg/l	
Hardness as CaCO ₃ , mg/l	
Hydroxide as OH, mg/l	
Iron as Fe (Dissolved), mg/l	
Iron as Fe (Total), mg/l	33.0
Lead as Pb, mg/l	0.72
Magnesium as Mg, mg/l	
Manganese as Mn, mg/l	1.07
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	0.025
Nitrate as NO ₃ -N, mg/l	
Nitrite as NO ₂ -N, mg/l	
Phosphate as PO ₄ -P, mg/l	
Potassium as K, mg/l	
Selenium as Se, mg/l	<.002
Silica as SiO ₂ (Dissolved), mg/l	
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	
Sulfate as SO ₄ , mg/l	
Total Dissolved Solids, mg/l	
Turbidity, NTU	
Zinc as Zn, mg/l	0.458
pH Units	

PARAMETER

LEVEL

Alkalinity as CaCO ₃ , mg/l	
Ammonia as NH ₃ -N, mg/l	
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	0.019
Bicarbonate as HCO ₃ , mg/l	
Boron as B, mg/l	
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	
Carbonate as CO ₃ , mg/l	
Molybdenum as Mo, mg/l	<.01

Rep. Harder

 CHEMTECH

367 SOUTH COMMERCE LOOP
OREM, UTAH 84057
(801) 226-8822

2875 MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1163

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121

LAB NO.: U015045

DATE SAMPLED: 9-18-86

TIME SAMPLED: 0945

SAMPLED BY: E.L.

LOCATION: SW-9
Anaconda -Carr Fork

COMMENTS: Metals - Dissolved

PARAMETER

LEVEL

Chloride as Cl, mg/l	23.6
Chromium as Cr (Hex.), mg/l	--
Chromium as Cr (Total), mg/l ... (diss)	<.01
Conductivity, umhos/cm	532
Copper as Cu, mg/l	0.025
Fluoride as F, mg/l	0.78
Hardness as CaCO ₃ , mg/l	260
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	0.67
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.022
Magnesium as Mg, mg/l	23.4
Manganese as Mn, mg/l	0.018
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	<.01
Nitrate as NO ₃ -N, mg/l	2.05
Nitrite as NO ₂ -N, mg/l	0.037
Phosphate as PO ₄ -P, mg/l ... (ortho)	0.020
Potassium as K, mg/l	6.5
Selenium as Se, mg/l	<.002
Silica as SiO ₂ (Dissolved), mg/l	--
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	8.18
Sulfate as SO ₄ , mg/l	90
Total Dissolved Solids, mg/l	353
Turbidity, NTU	--
Zinc as Zn, mg/l	0.052
pH Units	8.25
TOC, mg/l	27.8
Oil & Grease, mg/l	2.62

Rgs Hernandez

PARAMETER	LEVEL
Acidity as CaCO ₃ , mg/l	0
Alkalinity as CaCO ₃ , mg/l	137
Ammonia as NH ₃ -N, mg/l	<.1
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	<.01
Bicarbonate as HCO ₃ , mg/l	167
Boron as B, mg/l	0.26
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	52.5
Carbonate as CO ₃ , mg/l	0
Molybdenum as Mo, mg/l	<.01
TSS, mg/l	1360
Cyanide as CN, mg/l	0.004
Sulfide as S, mg/l	<.1

367 SOUTH COMMERCE LOOP
 OREM, UTAH 84057
 (801) 226-8822

2875 MAIN
 SUITE #101
 SALT LAKE CITY, UTAH 84115
 (801) 483-1163

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121

LAB NO.: U015045

DATE SAMPLED: 9-18-86

TIME SAMPLED: 0945

SAMPLED BY: E.L.

LOCATION: SW-9
Anaconda - Carr Fork

COMMENTS: Metals - TOTAL

PARAMETER

LEVEL

Chloride as Cl, mg/l	
Chromium as Cr (Hex.), mg/l	
Chromium as Cr (Total), mg/l	0.060
Conductivity, umhos/cm	
Copper as Cu, mg/l	5.08
Fluoride as F, mg/l	
Hardness as CaCO ₃ , mg/l	
Hydroxide as OH, mg/l	
Iron as Fe (Dissolved), mg/l	
Iron as Fe (Total), mg/l	105
Lead as Pb, mg/l	3.36
Magnesium as Mg, mg/l	
Manganese as Mn, mg/l	1.23
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	0.095
Nitrate as NO ₃ -N, mg/l	
Nitrite as NO ₂ -N, mg/l	
Phosphate as PO ₄ -P, mg/l	
Potassium as K, mg/l	
Selenium as Se, mg/l	0.003
Silica as SiO ₂ (Dissolved), mg/l	
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	
Sulfate as SO ₄ , mg/l	
Total Dissolved Solids, mg/l	
Turbidity, NTU	
Zinc as Zn, mg/l	1.99
pH Units	

PARAMETER

LEVEL

Alkalinity as CaCO ₃ , mg/l	
Ammonia as NH ₃ -N, mg/l	
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	0.045
Bicarbonate as HCO ₃ , mg/l	
Boron as B, mg/l	
Cadmium as Cd, mg/l	0.038
Calcium as Ca, mg/l	
Carbonate as CO ₃ , mg/l	
Molybdenum as Mo, mg/l	0.11

Res. Henderson

367 SOUTH COMMERCE LOOP
OREM, UTAH 84057
(801) 226-8822

2875 MAIN
SUITE #101
SALT LAKE CITY, UTAH 84115
(801) 483-1163

CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121
LAB NO.: U015046
DATE SAMPLED: 9-18-86
TIME SAMPLED: 0900
SAMPLED BY: E.L.
LOCATION: SW-12
Anaconda - Carr Fork
COMMENTS: Metals - Dissolved

PARAMETER

LEVEL

Chloride as Cl, mg/l	26.1
Chromium as Cr (Hex.), mg/l	--
Chromium as Cr (Total), mg/l	<.01
Conductivity, umhos/cm	502
Copper as Cu, mg/l	0.032
Fluoride as F, mg/l	0.17
Hardness as CaCO ₃ , mg/l	237
Hydroxide as OH, mg/l	0
Iron as Fe (Dissolved), mg/l	2.50
Iron as Fe (Total), mg/l	--
Lead as Pb, mg/l	0.16
Magnesium as Mg, mg/l	25.3
Manganese as Mn, mg/l	0.090
Mercury as Hg, mg/l	<.0002
Nickel as Ni, mg/l	<.01
Nitrate as NO ₃ -N, mg/l	1.86
Nitrite as NO ₂ -N, mg/l	0.011
Phosphate as PO ₄ -P, mg/l .. (ortho)	0.050
Potassium as K, mg/l	2.7
Selenium as Se, mg/l	<.002
Silica as SiO ₂ (Dissolved), mg/l	--
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	8.16
Sulfate as SO ₄ , mg/l	64
Total Dissolved Solids, mg/l	344
Turbidity, NTU	--
Zinc as Zn, mg/l	0.065
pH Units	8.41
TOC, mg/l	21.2
Oil & Grease, mg/l	1.26

PARAMETER	LEVEL
Acidity as CaCO ₃ , mg/l	0
Alkalinity as CaCO ₃ , mg/l	159
Ammonia as NH ₃ -N, mg/l	<.1
Arsenic as As, mg/l	<.01
Barium as Ba, mg/l	<.01
Bicarbonate as HCO ₃ , mg/l	189
Boron as B, mg/l	0.20
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l	48.5
Carbonate as CO ₃ , mg/l	3.3
Molybdenum as Mo, mg/l	<.01
TSS, mg/l	680
Cyanide as CN, mg/l	0.006
Sulfide as S, mg/l	<.1

R. A. Anderson

367 SOUTH COMMERCE LOOP
 OREM, UTAH 84057
 (801) 226-8822

2875 MAIN
 SUITE #101
 SALT LAKE CITY, UTAH 84115
 (801) 483-1163


CERTIFICATE OF ANALYSIS

SAMPLE IDENTIFICATION

CLIENT: JBR Consultants, Inc.
1841 Fort Union Blvd.
Salt Lake City, UT 84121
 LAB NO.: U015046
 DATE SAMPLED: 9-18-86
 TIME SAMPLED: 0900
 SAMPLED BY: E.L.
 LOCATION: SW-12
Anaconda - Carr Fork
 COMMENTS: Metals - TOTAL

PARAMETER	LEVEL
Chloride as Cl, mg/l.....	
Chromium as Cr (Hex.), mg/l	
Chromium as Cr (Total), mg/l	0.015
Conductivity, umhos/cm.....	
Copper as Cu, mg/l	0.185
Fluoride as F, mg/l	
Hardness as CaCO ₃ , mg/l.....	
Hydroxide as OH, mg/l	
Iron as Fe (Dissolved), mg/l.....	
Iron as Fe (Total), mg/l	11.2
Lead as Pb, mg/l	0.48
Magnesium as Mg, mg/l	
Manganese as Mn, mg/l	0.46
Mercury as Hg, mg/l.....	<.0002
Nickel as Ni, mg/l	0.050
Nitrate as NO ₃ -N, mg/l.....	
Nitrite as NO ₂ -N, mg/l	
Phosphate as PO ₄ -P, mg/l	
Potassium as K, mg/l	
Selenium as Se, mg/l	<.002
Silica as SiO ₂ (Dissolved), mg/l	
Silver as Ag, mg/l	<.01
Sodium as Na, mg/l	
Sulfate as SO ₄ , mg/l	
Total Dissolved Solids, mg/l.....	
Turbidity, NTU	
Zinc as Zn, mg/l	0.138
pH Units.....	

PARAMETER	LEVEL
Alkalinity as CaCO ₃ , mg/l.....	
Ammonia as NH ₃ -N, mg/l	
Arsenic as As, mg/l	0.012
Barium as Ba, mg/l.....	0.012
Bicarbonate as HCO ₃ , mg/l	
Boron as B, mg/l.....	
Cadmium as Cd, mg/l	<.01
Calcium as Ca, mg/l.....	
Carbonate as CO ₃ , mg/l	
Molybdenum as Mo, mg/l	<.01



 CHEMTECH